COLLABORATIVE DOCUMENT PROCESSING SYSTEM WITH VERSION AND COMMENT MANAGEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a document processing system for writing, editing, and managing documents, which is particularly suitable for a collaborative document processing work to be carried out by a plurality of users.

2. Description of the Background Art

Conventionally, a document processing system has been designed to be used for writing, editing, and managing the documents by each user separately, so that there has been the following problems in a case of a collaborative document processing work to be carried out by a plurality of users.

(1) In a case of writing a document by assigning different parts of the document to each collaborating author, in order to make a coordination of the different parts of the document written by different authors, it is often necessary for each author to make an electronic copy of the assigned part of the document to be sent through an electronic mail or a print out of the assigned part of the document on papers, so as to put the different parts of the document written by different authors together into one document. However, such a work required in relation to the coordination of the different parts of the document is extremely tedious. In addition, when there is a section which appears repeatedly in different parts of the document, many different versions of this same section are produced by different authors, and all of these different versions but one are going to be discarded in a process of making the coordination throughout the entire document, so that there is a great amount of waste involved in such a collaborative document production work.

(2) In a case in which a plurality of proofreaders are is going to check the document, the copies of the document must be distributed among these proofreaders, and then after the comments are written into the distributed copies of the document by each proofreader, the copies of the document containing these comments must be distributed among the authors or editors. However, such work required in relation to the proofreading of the document and the comment annotation is extremely tedious to handle manually.

(3) In a case of disclosing a part of the document to persons other than the assigned author, that part of the document must be copied as a separate document, and the permission for reading this separate document containing the disclosed part must be given to each person to whom the disclosure is intended. However, such a work required in relation to the disclosure of a part of the document is quite tedious, as well as wasteful in a sense that many copies of the same part must be produced.

(4) In a case the document is managed electronically, there are cases in which an execution of a specific electronic operation on the document is to be permitted or prohibited only to limited persons under the specific conditions. However, in order to achieve such a controlling of the execution of the operations in the system, it has been necessary conventionally to provide a specially programmed software program for each controlling to be made, separately.

(5) In a case of executing a document processing operation which affects the works of a plurality of authors, such as a modification of a part of the document under the collaborative document processing work, it is often necessary to notify the execution of such a document processing operation to the other authors who can be affected. However, such a work of notification is quite tedious and often forgotten to cause the trouble in the collaborative document processing work.

(6) There are cases in which it is necessary to make a group decision concerning the document written in collaboration among a plurality of collaborating authors according to a predetermined procedure such as the decision by majority. In such a case, the group decision must be made by the collaborating authors first, and then the system must be controlled manually to take the group decision made by the collaborating authors into account. However, such a group decision making process and a work for incorporating the result of the group decision have been quite inconvenient.

In short, these problems enumerated above are caused by the fact that a conventional document processing system does not possess a function to control the various processings executable in the system under the minutely defined processing conditions, because the processings available to the users have been basically limited to three types of "read", "write", and "execute" in a conventional document processing system.

More recently, there has been proposals for document processing systems for writing, editing, and managing documents, suitable for a collaborative document processing work to be carried out by a plurality of authors. For example, there is a system proposed by T. Catlin et al. in "InterNote: Extending a Hypermedia Framework to Support Annotative Collaboration", Hypertext '89 Proceedings, November 1989, which discloses examples of a hypertext system which is capable of attaching comments by the authors to the document.

However, in such a conventional document processing system, the version information of the revised document and the comments attached to the processed document have been managed quite separately.

For this reason, in a case the revision has been made to a document to be written in collaboration, there has been a case in which it is impossible for one of the collaborating authors to properly comprehend the reason for making the revision or the source of the decision for making the revision, because it has been impossible in a conventional document processing system to present the comments by the other collaborating authors in relation to the document.

Moreover, even when the appropriate comments are attached to the document, there has also been a case in which it is difficult for one of the collaborating authors to recognize exactly how these comments are reflected in the revised version of the document.

In other words, a conventional document processing system has been insufficient for fully supporting the collaborative document processing work, because the conventional document processing system has only a very limited communication facility among the collaborating authors.

In addition, in a conventional hypertext system used as a document processing system, a relationship using a data unit or a part of the data in the data unit as an anchor has been expressed as a two-term relationship using directed or non-directed links, so that it has been impossible to express a multi-term relationship concerning more than two data units or more than two parts of the data in the data units. For this reason, even when there is a multi-term relationship among one parent unit and two child units sharing the same parent unit, it has been impossible to make a direct reference from one of the child units to another one of the child units